

U.S. Patent Application Serial No. **09/926,160**  
Response dated December 17, 2003  
Reply to OA of **September 23, 2003**

**REMARKS**

Claims 1, 2 and 4-8 are pending in this application. Amendments are proposed amending claim 1 and canceling claims 2 and 4. Upon entry of this amendment, claims 1 and 5-8 will be pending.

**Regarding the examined claims.**

In the final Office action, the Examiner indicates that claims 1, 2 and 4-7 are pending. However, claim 8 was added in the Amendment of June 30, 2003, and is entitled to consideration.

Applicants' representative Daniel Geselowitz telephoned Examiner Wachtel on October 8, 2003, requesting a new Office action examining claim 8. Examiner Wachtel indicated that if Applicants responded to the rejections in the present Office action and noted that claim 8 had not been examined, he would issue a non-final Office action in response.

**Claims 1, 2 and 4-7 are rejected under 35 U.S.C. §103(a) as being unpatentable over JP 03106942A in view of U.S. 5,747,533 to Guzauskas in view of JP 06313019A substantially as set forth in paragraphs 6 and 7 of the previous Office action.** (Office action paragraph no. 3)

Reconsideration of the rejection of claims 1 and 5-7 is respectfully requested in view of the proposed amendments to the claims. In the amendments, claim 1 has been amended to incorporate the limitations of claims 2 and 4. Claims 2 and 4 have accordingly been canceled.

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In the rejection, the Examiner cites JP 03106942A for disclosing a sheet that can be molded and shaped at a low temperature by impregnating a fibrous reinforcement with a photocurable unsaturated polyester monomer resin solution, with a saturated polyester resin film which can be swollen and softened by a component contained in the resin solution. That is, the Examiner states that JP'942A discloses limitations (a), (c) and (d) of claim 1, and also discloses the compatibility portion of limitation (b), although not the polymethyl methacrylate limitation.

The Examiner cites Guzauskas for the disclosure of polymethyl methacrylate and substitutes this polymethyl methacrylate for the photocurable unsaturated polyester monomer resin in JP'942A.

In the amendment to claim 1, component (b) is limited to be in “powdered form having a weight average molecular weight of 100,000 or more”, and the photocurable sheet-form material is recited to comprise component “(e) one or more resins selected from a (meth)acrylic polymer, an unsaturated polyester, a vinyl ester, or an urethane acrylate”.

To clarify the relationship between the components of JP'942A and claim 1, Applicants present the following table.

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JP '942A	Claim 1	Comment
crosslinking monomer (example: styrene)	(a) polymerizable unsaturated monomer (acrylic)	Resin component
metal oxide (see Examples)	(b) polymer: polymethyl methacrylate or consisting of methyl methacrylate units, in <b>powdered form</b>	thickener
liquid unsaturated polyester resin	(e) radical-curable polymer resin (ex. unsaturated polyesters, vinyl esters, etc.)	Resin component
fibrous reinforcement	fibrous reinforcement	fiber material
photocuring agent	photocuring agent	reinforcing agent

It is noteworthy that the liquid unsaturated polyester resin, which is the resin component in JP'942A, corresponds to the radical-curable polymer resin (e) of the present invention. There is also a difference with respect to the thickeners in JP'942A and claim 1.

Applicants note that the Examiner appears to have considered component (b) in claim 1 to correspond to the "unsaturated polyester resin" of JP'942A. However, it is clear that component (b) in claim 1 of the present application **does not** have unsaturated groups and thus **cannot** correspond to the "unsaturated polyester resin" of JP'942A. JP'942A discloses a photocurable sheet of an unsaturated polyester resin that can be molded at a low temperature, and this resin corresponds to

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the unsaturated polyester resin which is component (e) of the present invention, and the polymer of component (a) of the present invention is **not contained** in the sheet of JP'942A. Applicants submit that JP'942A does not teach or suggest a main component and thickener corresponding to component (a) of the present invention.

Still further, as amended, component (b) of the present invention is in **powdered** form, while the “unsaturated polyester resin” of JP'942A is a **liquid**. Applicants submit that there is no teaching or suggestion in JP'942A for a component corresponding to component (b) in present claim 1.

With regard to the combination with Guzauskas (U.S. Patent No. 5,747,553), this reference does not disclose a photocurable sheet. Guzauskas discloses “thermosetting” molding compositions in column 1, lines 11 and 15. Guzauskas as disclosed in the Examples, lines 9 and 45 of column 6, and lines 23 and 34 of column 7, relates to a composition for BMC and solves problems of compositions which require fillers. Therefore, there would be no general motivation in the references to substitute a component from the thermosetting system of Guzauskas into the photocurable system of JP'942A.

The present invention relates to a photocurable sheet and thus is constituted such that it does not contain a filler which would hinder transmission of light. Furthermore, the object of the present invention is “to obtain an excellent sheet-form material having excellent productivity, handleability, and photocurability”, which clearly differs from the objects of Guzauskas. Accordingly, even if the

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composition of JP'942A and Guzauskas were simply made into sheets, it can be seen that the aforementioned object of the present invention would not be achieved.

Furthermore, Guzauskas neither discloses nor suggests the SP value limitation of the present claims.

Japanese Unexamined Patent Application, First Publication No. Hei 6-313019 (JP'019) relates to an acrylic syrup comprising an acrylic resin and an acrylic monomer, a cross-linked polymer powder resin composition, and to a method for producing artificial marble. The artificial marble disclosed by the cited invention is excellent in terms of viscosity, water resistance, moldability, and texture, but there is no teaching or suggestion concerning a photocurable sheet as in the present invention or the constituent components thereof. In fact, Applicants note that claim 7 of JP'019 recites a filler as an indispensable component and thus teaches away from photocurability.

### **Regarding thickeners**

When JP'942A and the present invention are compared based on the corresponding relationships shown in the table above, Applicants believe that it is apparent that there is no clear motivation for modification of the thickener of JP'942A to be a polymer as recited in claim 1. In JP'942A, magnesium oxide is used as a thickener in Examples 1 and 2, but, as disclosed in the specification of the present application, when a metal oxide is used as a thickener, there are problems

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related to solubility into monomers such as styrene and acrylic monomer, and it is recognized that problems arise during photocuring. Accordingly, it is conceivable that there are inducements to use components other than metal oxides as thickeners; however, as disclosed in the Background Art of the present specification, when acrylic resin powders are used as thickeners, problems with the insoluble portions thereof similarly arise during photocuring. Thus, it can be seen that, in the technical field pertaining to the present invention, common technical knowledge **teaches away** from the use of acrylic resin powders as thickeners. From this standpoint, it can also be seen that Guzauskas, which uses solid acrylic resin, does not suggest the present invention.

In the present invention, a methacrylic type resin powder is used as a thickener, but it can be seen that it is not, in fact, an acrylic type resin powder and, furthermore, greatly differs from the metal oxide of JP'942A. Therefore, JP'942A does not, in fact, provide component (b) of the present claims. There appears to be no suggestion in any of the cited references to substitute a polymer such as recited for component (b) for the metal oxide in JP'942A.

JP'019 does disclose an emulsion polymerization of a methacrylic type monomer as cross-linked polymer powder (B). A methyl methacrylate polymer is cited in the Examples of JP'019 and does overlap somewhat with the polymethyl methacrylate thickener of the present invention; however, the component in JP'019 which corresponds to component (a) of the present invention is (meta)acrylate polymer, which differs from component (a) of the present invention, an unsaturated polyester resin (radical-curable polymer resin) or the like. Given the fundamentally different

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composition of JP'019 from JP'942A, there would be no reason to substitute powder (B) in JP'019 for the metal oxide in JP'942A..

Applicants respectfully disagree with the Examiner's assertion that "the acrylic monomers [of JP'019] inherently possess the claimed solubility parameters" (page 4 of Office action of March 28, 2003. Applicants do not believe that the Examiner has provided a proper basis in fact or technical reasoning that the particular solubility parameter limitations of claim 1 would necessarily be inherent in these compounds. Moreover, this portion of the rejection is based on substitution of the acrylic monomers in JP'019 for the crosslinking monomer in JP'942A, which is styrene in the examples. The styrene monomers of JP'942 almost certainly would not have the recited limitation, and there is no reason to conclude that the acrylic monomers of JP'019 would possess this limitation. Applicants submit that there is no clear suggestion for substitution of the acrylic monomers of JP'019 into JP'942, and given the use of styrene in JP'942, there would appear to be no suggestion or motivation for the solubility parameter limitation in JP'942A even if substituted with monomers from JP'019.

Applicants therefore submit that claims 1 and 5-7, as well as claim 8, are novel and non-obvious over JP'942, JP'019 and Guzauskas, taken separately or in combination.

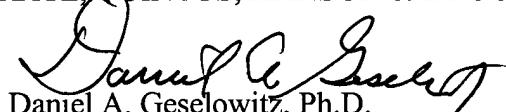
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If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicants undersigned agent at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

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